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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,277	07/17/2003	Lu Nguyen	909B.0027.U1(US)	4198

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EXAMINER	
CAO, PHUONG THAO	
ART UNIT	PAPER NUMBER
2164	

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/622,277	NGUYEN ET AL.	
	Examiner	Art Unit	
	Phuong-Thao Cao	2164	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,19,21,22 and 25-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,19,21,22 and 25-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to Amendment filed on 05/12/2006.

2. According to the amendment, claims 1 and 19 have been amended, claims 6-18, 20 and 23-24 have been canceled, and claims 25-30 have been added. Currently, claims 1-5, 19, 21-22 and 25-30 are pending.

Response to Arguments

3. Applicant's arguments filed on 05/12/2006 have been fully considered but they are not persuasive.

Regarding Applicant's argument that Yamagami is not seen to query or monitor an ongoing state of a database mirroring function, Yamagami teaches the continuous polling or continuous querying as the mirroring function is made to be ongoing (see [0089] and [0145] for creating entries for "mirror information" fields when a mirror operation is initiate [0089] and deleting the entries as the mirroring operation is deleted [0144]-[0146] which imply the inclusion of a way to monitor and track the mirroring of physical volumes or application objects; further see [0147], [0148] and [0151] the disclosure of detecting configuration change having affect on volume mirroring operations such as adding a new volume and mirroring the newly added physical volume imply that the system must include some way to monitor the mirroring to detect the configuration change as disclosed; also see [0040], [0156]-[0157] and Fig. 11).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-5, 19, 21-22, 25 and 27-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamagami et al. (Publication No US 2003/0233518).

As to claim 1, Yamagami et al. teach:

"A computer for dynamically mirroring a data storage configuration" (see [0029], [0147] and [0148]), comprising:

"a data interface coupled to a data storage medium through which information relating to a first storage configuration of the first data storage medium is communicated" (see [0051], [0052] and [0070] wherein "SCSI" is equivalent to Applicant's "data interface", a storage subsystem of each application server is equivalent to Applicant's "data storage medium", and "mapping information" is the information relating to storage configuration as illustrated in Applicant's claim language);

"a software agent embodied on a computer readable medium for comparing the first storage configuration to a second configuration, and at least when a storage configuration parameter differs between the first and the second storage configurations, for one of automatically conforming the first storage configuration to mirror the second storage configuration and automatically output a change to be made to conform the second storage configuration to mirror the first storage configuration" (see [0050]-[0052], [0078], [0147] and [0148] wherein VPM agent and/or VPM engine is equivalent to Applicant's "software agent", and the disclosure of detecting a configuration change and mirroring added or removed primary volumes or added or removed mirror volumes, wherein "primary volumes" is equivalent to Applicant's "first storage" and "mirror volumes" is equivalent to Applicant's "second storage", implies the inclusion of comparing the first storage configuration to the second storage configuration and conforming one storage configuration to mirror the other storage configuration as illustrated in Applicant's claim language);

"a communications interface through which one of the second storage configuration is received and the change is transmitted" (see [0142], [0147] and [0148] wherein "mirror volumes" is equivalent to Applicant's "second storage" and [0148] discloses that VPM agent can communicate information relating to configuration change to VPM engine, which means there must exist a communications interface as illustrated in Applicant's claim language; also see [0118], [0119] and [0144]); and

"a data processor for executing the software agent" (see [0043] and [0044] wherein "VPM server" is equivalent to Applicant's "data processor", and "VPM engine" is equivalent to Applicant's "software agent"; also see [0048]- [0050]);

"wherein the software agent is further for, while conforming the second storage configuration to mirror the first storage configuration, querying a state of the conforming for one of a proper configuration of the first or second storage configuration or a failure of a link over which the second storage configuration is received or the change to be made is transmitted" (see [0147] and [0148] wherein a configuration change represents a state of the conforming and detecting a configuration change and making the necessary updates to the various tables which constitute the system configuration table [0079] is equivalent to query a state of the conforming for one of a proper configuration as illustrated in Applicant's claim language).

As to claim 2, this claim is rejected based on arguments given above for rejected claim 1 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein the storage configuration parameter is selected from the group: a database layout; a logical unit number (LUN) type; a LUN size; a measure of LUN performance; and a measure of LUN reliability" (see [0118], [0119] wherein mapping information for each instance of a database is equivalent to Applicant's "database layout"; see [0074], [0075], [0071] and [0091] wherein physical volume or physical disk is equivalent to Applicant's "LUN", wherein vendor name, system name and serial number of the disk system imply a logical unit number (LUN) type and LUN size as illustrated in Applicant's claim language, and wherein performance level and reliability level are equivalent to Applicant's "measure of LUN performance" and "measure of LUN reliability").

As to claim 3, this claim is rejected based on arguments given above for rejected claim 1 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein the software agent is configured to one of output the first storage configuration to and receive the second storage configuration from a second software agent through the communication interface" (see [0050], [0142] and [0148] wherein VPM agent is equivalent to Applicant's "software agent", VPM engine is equivalent to Applicant's "second software agent", "information about the applications" is equivalent to Applicant's "first storage configuration", and "information to begin mirroring operations" is equivalent to Applicant's "second storage configuration").

As to claim 4, this claim is rejected based on arguments given above for rejected claim 1 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein conforming the first storage configuration to mirror the second storage configuration comprises creating a secondary LUN based on at least one of a LUN type and a LUN size received through the communications interface when a primary LUN of the data storage medium is unsuitable" (see e.g., [0133]-[0133] disclose the selection of suitable mirror volume based on criteria arguments which include LUN type and LUN size [0091] as discussed above, as illustrated in Applicant's claim language; also see [0147], [0148], [0151], [0156] and [0157] for configuration mirroring to occur between storage systems in both directions).

As to claim 5, this claim is rejected based on arguments given above for rejected claim 1 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein the software agent receives the first storage configuration from a relational database management computer program" (see [0119] wherein VPM agent is equivalent to Applicant's "software agent" and the usage of SQL in Oracle to obtain primary volume information [0099] indicates Oracle application as a relational database management computer program, as illustrated in Applicant's claim language).

As to claim 19, Yamagami et al. teach:

"A method of automatically extending a storage system hardward mirroring function" (see [0151]), comprising:

"mapping volumes received from a particular local storage system corresponding to physical LUNs, said physical LUNs being mirrored to a remote storage subsystem, and querying a state of the mirroring to determine a proper configuration for an application or database" (see [0125] and [0130] for the mapping between logical volume to physical volumes (or primary volumes) wherein physical volumes (or primary volumes) are equivalent to Applicant's "physical LUNs"; see [0133] and [0134] and [0187] wherein remote mirror volume implies Applicant's "remote storage subsystem" and the disclosure of mirror volume as physical disk [0134] implies said physical LUNs being mirrored as illustrated in Applicant's claim language; and see [0147] and [0148] wherein a configuration change represents a state of the mirroring and

detecting a configuration change and making the necessary updates to the various tables which constitute the system configuration table [0079] implies the querying a state of the mirroring to determine a proper configuration as illustrated in Applicant's claim language because the system must have a way to monitor or query as in Applicant's claim language in order to detect the configuration change and update the configuration table provides a way to reconfigure the system properly; also see [0093]-[0099], [0040], [0156]-[0157] and Fig. 11);

"if the application or database is not configured properly to perform mirroring, then" (see [0147] and [0148] wherein when change the configuration of a data object is equivalent to Applicant's "the application or database is not configured properly to perform mirroring" because the volume manager needs to reconfigure its disk group, then the newly added physical volume is mirrored; and see Fig. 9):

"evaluating remote mirror LUNs based on at least one of size, type, performance and reliability to find suitable LUN" (see [0133]-[0137] and [0187] for the selection of mirror volumes wherein mirror volumes are equivalent to Applicant's "remote mirror LUNs");

"creating a suitable remote mirror LUN if a suitable LUN is not found" (see [0179]-[0195] for the disclosure of createmirror command which allows to create a suitable mirror volume [0195] wherein mirror volume is equivalent to Applicant's "mirror LUN", as illustrated in Applicant's claim language); and

"creating a suitable target and mirroring a volume if a volume is to be added" (see e.g., [0147]-[0148] discloses that newly added physical volumes must be mirrored which implies creating a target and mirroring a volume if it is to be added as illustrated in Applicant's claim language).

As to claim 21, this claim is rejected based on arguments given above for rejected claim 19 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein said evaluating determines a proper modification at said remote storage subsystem that includes invoking procedures to mirror at least one new volume and assigning the at least one new volume to said remote storage subsystem" (see [0147] and [0148] wherein mirror volume is located in remote storage subsystem [0187]; also see [0151] for the mirroring occurring between storage systems in both directions).

As to claim 22, this claim is rejected based on arguments given above for rejected claim 21 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein said modification further includes adding at least one new volume to an operating logical volume, updating a remote storage subsystem and invoking procedures to mirror said at least one new volume" (see [0147], [0148], [0151] and [0157] wherein data object is equivalent to Applicant's "operating logical volume").

As to claim 25, this claim is rejected based on arguments given above for rejected claim 1 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein the software agent is further for, automatically responsive to determination from the querying of an improper configuration of the first or second storage configuration" (see [0147] and [0148] wherein VPM agent or VPM engine on the VPM server is equivalent to Applicant's "software agent", configuration change of one storage implies an improper configuration of the other storage, detecting implies the inclusion of querying, and updating the various tables (system configuration table [0078]) in order to mirroring, for instance, the newly added volume is equivalent to automatically responsive to determination as illustrated in Applicant's claim language):

"evaluating remote mirror LUNs based on at least one of size, type, performance and reliability to find suitable LUN" (see [0133]-[0137] and [0187] for the selection of mirror volumes wherein mirror volumes are equivalent to Applicant's "remote mirror LUNs");

"creating a suitable remote mirror LUN if a suitable LUN is not found" (see [0179]-[0195] for the disclosure of createmirror command which allows to create a suitable mirror volume [0195] wherein mirror volume is equivalent to Applicant's "mirror LUN", as illustrated in Applicant's claim language); and

"creating a suitable target and mirroring a volume if a volume is to be added" (see e.g., [0147]-[0148] discloses that newly added physical volumes must be mirrored which implies creating a target and mirroring a volume if it is to be added as illustrated in Applicant's claim language).

As to claim 27, Yamagami et al. teach:

"A computer program embodied on a computer readable storage medium for extending a storage system hardware mirroring function" (see [0151]), the computer program comprising instructions for:

"mapping volumes received from a particular local storage system corresponding to physical LUNs, said physical LUNs being mirrored to a remote storage subsystem, and querying a state of the mirroring to determine a proper configuration for an application or database" (see [0125] and [0130] for the mapping between logical volume to physical volumes (or primary volumes) wherein physical volumes (or primary volumes) are equivalent to Applicant's "physical LUNs"; see [0133] and [0134] and [0187] wherein remote mirror volume implies Applicant's "remote storage subsystem" and the disclosure of mirror volume as physical disk [0134] implies said physical LUNs being mirrored as illustrated in Applicant's claim language; and see [0147] and [0148] wherein a configuration change represents a state of the mirroring and detecting a configuration change and making the necessary updates to the various tables which constitute the system configuration table [0079] implies the querying a state of the mirroring to determine a proper configuration as illustrated in Applicant's claim language because the system must have a way to monitor or query as in Applicant's claim language in order to detect the configuration change and update the configuration table provides a way to reconfigure the system properly; also see [0093]-[0099], [0040], [0156]-[0157] and Fig. 11);

"if the application or database is not configured properly to perform mirroring, then" (see [0147] and [0148] wherein when change the configuration of a data object is equivalent to Applicant's "the application or database is not configured properly to perform mirroring"

because the volume manager needs to reconfigure its disk group, then the newly added physical volume is mirrored; and see Fig. 9):

"evaluating remote mirror LUNs based on at least one of size, type, performance and reliability to find suitable LUN" (see [0133]-[0137] and [0187] for the selection of mirror volumes wherein mirror volumes are equivalent to Applicant's "remote mirror LUNs");

"creating a suitable remote mirror LUN if a suitable LUN is not found" (see [0179]-[0195] for the disclosure of createmirror command which allows to create a suitable mirror volume [0195] wherein mirror volume is equivalent to Applicant's "mirror LUN", as illustrated in Applicant's claim language); and

"creating a suitable target and mirroring a volume if a volume is to be added" (see e.g., [0147]-[0148] discloses that newly added physical volumes must be mirrored which implies creating a target and mirroring a volume if it is to be added as illustrated in Applicant's claim language).

As to claim 28, this claim is rejected based on arguments given above for rejected claim 27 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein said evaluating determines a proper modification at said remote storage subsystem that includes invoking procedures to mirror at least one new volume and assigning the at least one new volume to said remote storage subsystem" (see [0147] and [0148] wherein mirror volume is located in remote storage subsystem [0187]; also see [0151] for the mirroring occurring between storage systems in both directions).

As to claim 29, this claim is rejected based on arguments given above for rejected claim 27 and is similarly rejected including the following:

Yamagami et al. teach:

"wherein said modification further includes adding at least one new volume to an operating logical volume, updating a remote storage subsystem and invoking procedures to mirror said at least one new volume" (see [0147], [0148], [0151] and [0157] wherein data object is equivalent to Applicant's "operating logical volume").

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 26 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagami et al. (Publication No US 2003/0233518) as applied to claim 1 above, and further in view of Yanai et al. (Publication No US 2004/0073831).

As to claim 26, this claim is rejected based on arguments given above for rejected claim 1 and is similarly rejected including the following:

Yamagami et al. do not teach "wherein the software agent is further for, automatically responsive to a determination from the querying that the link has failed, one of determining another link or creating a new link, separate from the failed link".

Yanai et al. teach "wherein the software agent is further for, automatically responsive to a determination from the querying that the link has failed, one of determining another link or creating a new link, separate from the failed link" (see [0207]).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yamagami et al. by the teaching of Yanai et al. to add the feature of automatically responsive to a determination from the querying that the link has failed by one of determining another link or creating a new link, separate from the failed link because detecting a link fail and responding to the link fail by using another link allow the communication continuing uninterrupted on the other link between two remotely mirrored data storage system (see Yanai et al., [0207]). As a result, the system is more reliable and effective to tolerate with link failure.

As to claim 30, Yamagami et al. teach:

"A method of automatically extending a storage systems hardware mirroring function" (see [0151]), comprising:

"mapping volumes received from a particular local storage system corresponding to physical LUNs, said physical LUNs being mirrored to a remote storage subsystem by at least one physical link" (see [0125] and [0130] for the mapping between logical volume to physical volumes (or primary volumes) wherein physical volumes (or primary volumes) are equivalent to

Applicant's "physical LUNs"; see [0133] and [0134] and [0187] wherein remote mirror volume implies Applicant's "remote storage subsystem" and the disclosure of mirror volume as physical disk [0134] implies said physical LUNs being mirrored as illustrated in Applicant's claim language; and see [0151] and Fig. 10 for remote copy links).

Yamagami et al. do not teach:

"querying a state of mirroring to determine that the at least one physical link has failed";

"responsive to the querying, automatically one of determining another physical link or creating a new physical link, separate from the failed physical link, by which to mirror the physical LUNs to the remote storage subsystem".

Yanai et al. teach:

"querying a state of mirroring to determine that the at least one physical link has failed" (see [0207] wherein detecting a T3 circuit or link failure is equivalent to Applicant's claim language);

"responsive to the querying, automatically one of determining another physical link or creating a new physical link, separate from the failed physical link, by which to mirror the physical LUNs to the remote storage subsystem" (see [0207] wherein automatically switching link paths is equivalent to responsive to the querying as illustrated in Applicant's claim language, and see Yamagami et al., [0151]).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yamagami et al. by the teaching of Yanai et al. to add the feature of querying a state of mirroring to determine that the at least one physical link has failed and responsive to the querying, automatically one of determining another physical link or

creating a new physical link, separate from the failed physical link, by which to mirror the physical LUNs to the remote storage subsystem because in other words, detecting a link fail and responding to the link fail by using another link allow the communication continuing uninterrupted on the other link between two remotely mirrored data storage systems (see Yanai et al., [0207] and Yamagami et al., [0151]). As a result, the system is more reliable and effective to tolerate with link failure.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong-Thao Cao whose telephone number is (571) 272-2735. The examiner can normally be reached on 8:30 AM - 5:00 PM (Mon - Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Rones can be reached on (571) 272-4085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PTC

June 16, 2006

Primary Examiner
Art Unit 2167